

The background of the slide is a photograph of the Northwestern University Medical Center. It features a prominent, historic stone building with a tall, ornate tower on the left, and a modern glass-walled skyscraper on the right. The sky is blue with some white clouds. A large, dark purple diagonal shape covers the left side of the image, serving as a background for the text.

M Northwestern Medicine®
Feinberg School of Medicine

Consumer Preferences for Sunscreens

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The Importance of Sunscreen

The background of the slide is a photograph of a person's wet skin, likely a shoulder or arm, with water droplets visible. The background is a bright blue, suggesting a beach or pool setting.

**5.4 million basal
cell and squamous
cell skin cancers
every year**

**178,000 new
melanomas yearly
– every hour an
individual dies of
melanoma**

1 in 5 Americans will develop a skin cancer by age 70

Background of Work

Efficacy, safety, and consumer preferences for personal care products

JAMA Internal Medicine

Research Letter

FREE

August 2017

Adverse Events Reported to the US Food and Drug Administration for Cosmetics and Personal Care Products

Michael Kwa, BA¹; Leah J. Welty, PhD²; Shuai Xu, MD, MSc³

[» Author Affiliations](#) | [Article Information](#)

JAMA Intern Med. 2017;177(8):1202-1204. doi:10.1001/jamainternmed.2017.2762

Background of Work

Efficacy, safety, and consumer preferences for personal care products



COMMENTARY

Cosmetics and Cancer: Adverse Event Reports Submitted to the Food and Drug Administration

Saya L. Jacob, Erika Cornell, Michael Kwa, William E. Funk, Shuai Xu

Background of Work

Efficacy, safety, and consumer preferences for personal care products

JCD
Journal of
Cosmetic Dermatology



EDITORIAL ECHO

WILEY

JCD
Journal of
Cosmetic Dermatology

Time for a makeover-cosmetics regulation in the United States

Erika M. Cornell MD¹  | Timothy M. Janetos MD, MBA²  | Shuai Xu MD, MSc¹

Background of Work

Efficacy, safety, and consumer preferences for personal care products

Pediatric Dermatology

WILEY Pediatric Dermatology

Adverse events reported to the Food and Drug Administration from 2004 to 2016 for cosmetics and personal care products marketed to newborns and infants

Erika Cornell BS¹ | Michael Kwa BA¹ | Amy S. Paller MD, MS² |
Shuai Xu MD, MSc (Lond)² 

Background of Work

Efficacy, safety, and consumer preferences for personal care products

Research

JAMA
Dermatology

JAMA Dermatology | **Original Investigation**

Consumer Preferences, Product Characteristics, and Potentially Allergenic Ingredients in Best-selling Moisturizers

Shuai Xu, MD, MSc (Lond); Michael Kwa, BA; Mary E. Lohman, MD; Rachel Evers-Meltzer, MD, MPH;
Jonathan I. Silverberg, MD, PhD, MPH

Background of Work

Efficacy, safety, and consumer preferences for personal care products

Research

JAMA
Dermatology

JAMA Dermatology | **Original Investigation**

Sunscreen Product Performance and Other Determinants of Consumer Preferences

Shuai Xu, MD, MSc; Michael Kwa, BA; Ashwin Agarwal, MD; Alfred Rademaker, PhD; Roopal V. Kundu, MD

The Importance of Consumer Preference



*Sunscreens don't
work in patients who
don't **apply** them.*

Methodology



Identified top 1% of sunscreens on 3 major online retailers by average rating and number of reviews.

Methodology: Qualitative Analysis of Comments

- For each top sunscreen product, the content of the top 5 most helpful positive and critical comments as voted by consumers (325 total comments) was analyzed
- Developed, compared, and reconciled into a single, standard qualitative coding scheme to code all comments
 - Positive theme set
 - Negative theme set
- Disagreements reconciled by 3 authors for comments

Results: Top 10 Sunscreens Based on Reviews

Table 1. Top 10 Most-Reviewed, Highly Rated Sunscreens According to Amazon.com^a

No.	Product	Reviews, No.	Rating (1-5)	Price per Ounce, \$	Type ^b	SPF	Broad Spectrum	Water Resistance ^b	Vehicle	Additional Claims ^c	AAD Criteria ^b
1	EltaMD UV Clear SPF 46	1792	4.4	13.38	Combination	46	Yes	No	Cream	Yes	No
2	Hawaiian Tropic Sunscreen Silk Hydration SPF 30	1078	4.6	1.33	Chemical	30	Yes	80 min	Lotion	Yes	Yes
3	Blue Lizard Australian Sunscreen, Sensitive SPF 30+	812	4.5	3.41	Physical	30	Yes	No	Cream	Yes	No
4	SPF 30 daily oil-free face moisturizer	786	4.7	5.98	Chemical	30	Yes	No	Cream	Yes	No
5	Neutrogena Age Shield Face Lotion Sunscreen SPF 110	740	4.4	3.73	Chemical	110	Yes	80 min	Lotion	Yes	Yes
6	EltaMD UV Physical SPF 41	715	4.7	6.57	Physical	41	Yes	40 min	Lotion	Yes	Yes
7	Neutrogena Ultra Sheer Dry-Touch Sunscreen, SPF 55	693	4.6	2.26	Chemical	55	Yes	80 min	Cream	Yes	Yes
8	Neutrogena Sunscreen Ultra Sheer Stick SPF 70	647	4.6	5.91	Chemical	70	Yes	80 min	Roll-on	Yes	Yes
9	Neutrogena Oil Free Moisture SPF 35	635	4.5	2.76	Chemical	35	Yes	No	Roll-on	Yes	No
10	Eucerin Daily Protection Moisturizing Face Lotion	631	4.3	1.76	Physical	30	Yes	No	Lotion	Yes	No

Results: Top 10 Sunscreens – Low Cost

Table 2. Top 10 Lowest-Cost, Highly Rated Sunscreens According to Amazon.com^a

No.	Product	Price per Ounce, \$	Reviews, No.	Rating (1-5)	Type ^b	SPF	Broad Spectrum	Water Resistance ^b	Vehicle	Additional Claims ^c	AAD Criteria ^b
1	NO-AD Sunscreen Lotion SPF 45	0.68	193	4.3	Chemical	45	Yes	80 min	Lotion	No	Yes
2	NO-AD Sport Sunscreen Lotion SPF 50	0.72	179	4.6	Chemical	50	Yes	80 min	Lotion	Yes	Yes
3	Banana Boat Sunscreen Sport Family Size Broad Spectrum Sun Care Sunscreen Lotion, SPF 50	0.83	259	4.5	Chemical	50+	Yes	80 min	Lotion	Yes	Yes
4	Australian Gold SPF 30 Spray Gel with Bronzer	0.90	254	4.6	Chemical	30	Yes	80 min	Spray	Yes	Yes
5	Banana Boat Sunscreen Sport Performance Quik Dri Broad Spectrum Sun Care Sunscreen Spray	1.02	178	4.2	Chemical	30	Yes	80 min	Spray	Yes	Yes
6	Banana Boat Sunscreen Sport Performance Coolzone Broad Spectrum Sun Care Sunscreen Spray	1.23	474	4.3	Chemical	50+	Yes	Yes	Spray	No	Yes
7	Hawaiian Tropic Sunscreen Silk Hydration SPF 30	1.33	1078	4.6	Chemical	30	Yes	80 min	Lotion	Yes	Yes
8	Babyganics Mineral-Based Baby Sunscreen Lotion, SPF 50	1.33	407	4.3	Combination	50+	Yes	80 min	Lotion	Yes	Yes
9	Zinc oxide powder	1.35	182	4.9	Physical	NL	NL	No	Powder	No	No
10	L'Oreal Paris Sublime Sun Advanced Sunscreen SPF 30 Crystal Clear Mist	1.41	279	4.4	Chemical	45	Yes	Yes	Spray	Yes	Yes

Results: Qualitative Analysis

Table 3. Positive and Negative Themes Identified by Consumer Comments for Highly Rated Sunscreens^{a,b}

Positive Coding Themes				Negative Coding Themes			
Major Theme	Subtheme	Exemplary Quote	No. (%) of Comments	Major Theme	Subtheme	Exemplary Quote	No. (%) of Comments
Cosmetic elegance			198 (61)	Cosmetic elegance			72 (22)
	Absorbs well	"You feel it there for about 5 min and then it absorbs very well"	124 (38)		Skin residue	"It left a white residue all over my face"	26 (8)
	Tactile skin feel	"Doesn't leave my skin feeling oily, just smooth"	107 (33)		Too thick	"This cream was way too thick and impossible to rub in"	23 (7)
	Not greasy	"Goes on easily with no greasiness"	75 (23)		Greasy	"The biggest drawback with the American formula is GREASE"	20 (6)
	Moisturizing	"It leaves my skin feeling moisturized and protected"	46 (14)		Bad smell	"It absolutely reeks"	20 (6)
	Nice smell	"Love the barely-there fragrance"	42 (13)		Bad skin feel		13 (4)

Results: Qualitative Analysis

Table 3. Positive and Negative Themes Identified by Consumer Comments for Highly Rated Sunscreens^{a,b}

Positive Coding Themes				Negative Coding Themes			
Major Theme	Subtheme	Exemplary Quote	No. (%) of Comments	Major Theme	Subtheme	Exemplary Quote	No. (%) of Comments
Performance			146 (45)		Makeup incompatible		1 (0.3)
	Effective	"Thin yet highly potent even with such a small amount"	117 (36)	Performance			36 (11)
	Did not sunburn	"I was able to stay out at my children's soccer games for the entire afternoon with no sunburn"	49 (15)		Not effective		13 (4)
	Water and/or sweat proof	"I was pleased to find it remained on for around 90 min worth of direct sunlight and sweating"	29 (9)		Sunburned		13 (4)
	High SPF	"I'm absolutely obsessed with this SPF"	23 (7)		Packaging problem		10 (3)
	Broad spectrum	"It has the broad-spectrum rating from the FDA that means it protects from the UVA and UVB"	16 (5)		Not water and/or sweat proof		10 (3)

Results: Qualitative Analysis

Table 3. Positive and Negative Themes Identified by Consumer Comments for Highly Rated Sunscreens^{a,b} (continued)

Positive Coding Themes				Negative Coding Themes			
Major Theme	Subtheme	Exemplary Quote	No. (%) of Comments	Major Theme	Subtheme	Exemplary Quote	No. (%) of Comments
Skin compatibility			78 (24)	Skin tolerance			26 (8)
	Acne prone	"Works great with my acne prone skin"	42 (13)		Skin reaction	"Like another reviewer, I, too, had an allergic reaction with itching"	20 (6)
	Sensitive skin		13 (4)				
	Safe for kids		10 (3)				
	No eye stinging		7 (2)		Burning on application		10 (3)
	Oily skin		7 (2)				
	Darker skin		7 (2)		Burns eyes		7 (2)
	Rosacea		3 (1)				
	No skin reaction		3 (1)				
	Melasma		3 (1)				
	Eczema		3 (1)				

Table 3. Positive and Negative Themes Identified by Consumer Comments for Highly Rated Sunscreens^{a,b}

Positive Coding Themes				Negative Coding Themes			
Major Theme	Subtheme	Exemplary Quote	No. (%) of Comments	Major Theme	Subtheme	Exemplary Quote	No. (%) of Comments
Product ingredients			55 (17)	Product ingredients			33 (10)
					Unsafe ingredients		10 (3)
	Natural and/or organic ingredients	"Made [...] with [...] certified 'organic' ingredients"	33 (10)		Nanoparticles		7 (2)
	Zinc oxide	"The active ingredients are Zinc Oxide and Titanium Dioxide, which are high quality minerals for broad spectrum UVA and UVB skin protection"	33 (10)		Retinyl palmitate		3 (1)
					Avobenzone		3 (1)
					Parabens		3 (1)
					Oxybenzone		3 (1)
					Homosalate		3 (1)
					Octinoxate		1 (0.3)
	Safe for children		10 (3)				
	Avobenzone		3 (1)				
	Titanium dioxide		3 (1)				
	Physical sunscreen		3 (1)				

Results: Qualitative Analysis

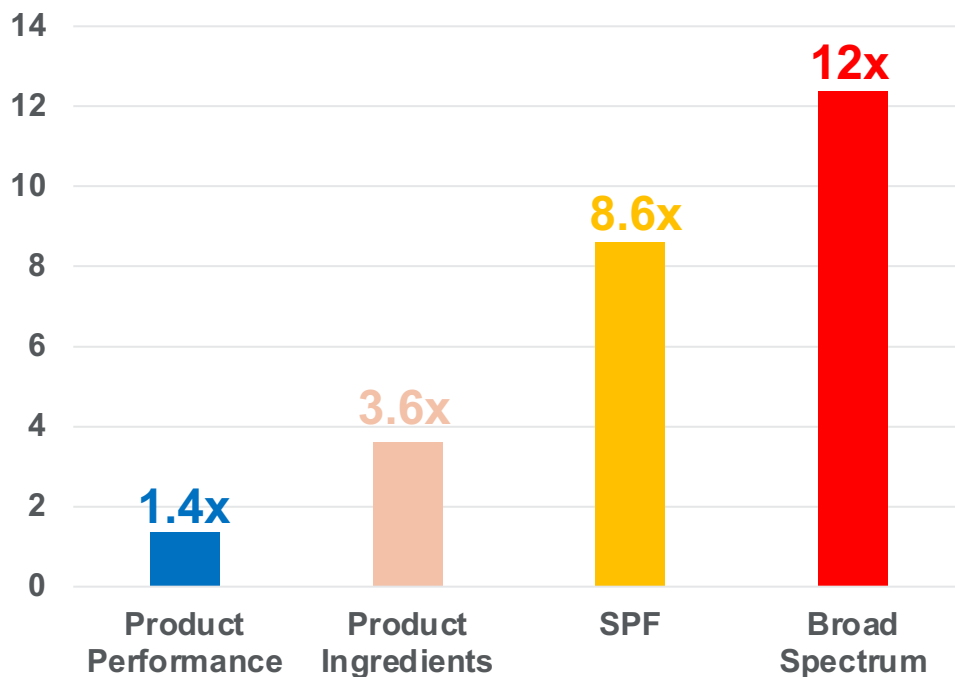
Table 3. Positive and Negative Themes Identified by Consumer Comments for Highly Rated Sunscreens^{a,b} (continued)

Positive Coding Themes				Negative Coding Themes			
Major Theme	Subtheme	Exemplary Quote	No. (%) of Comments	Major Theme	Subtheme	Exemplary Quote	No. (%) of Comments
Separate ratings			39 (12)	Expensive		"At nearly \$20 a tube, it isn't cheap"	29 (9)
	EWG	"I ordered this product after doing some research on the EWG's online database of the least harmful sunblocks"	23 (7)	Formulation change		"I was disappointed when I tried their new facial sunscreen formulation"	7 (2)
	Dermatologist recommended	"Was recommended to me by my dermatologist who is a specialist in skin cancer"	20 (6)	Separate ratings			3 (1)
	Consumer Reports		3 (1)		EWG		3 (1)
Affordable		"It's the best sunblock product on the market at a reasonable price"	29 (9)				

Conclusion for Highly Rated Sunscreens

- Only 4 out of 10 of these highly rated sunscreens met the AAD's guidelines
 - Lack of water resistance was the most common reason, but 11% failed to meet minimum SPF of 30
- Cosmetic elegance was the most commonly cited positive and negative theme
- Product ingredients, external ratings, and cost were less often mentioned


Cosmetic Elegance Mentioned More Often



What is Important to Consumers?

Figure. Mock Sunscreen Labels That Meet Current and Aim to Meet Proposed US Food and Drug Administration Guidelines

A Current



Hoolaban

Dry-Touch

SUNSCREEN

Broad Spectrum SPF 100+

100+

LIGHTWEIGHT
CLEAN FEEL

fast-absorbing
water resistant (80 minutes)

3.0 FL OZ (88mL)

Drug Facts

Active ingredients
Avobenzone 3%, Homosalate 15%, Octisalate 5%,
Octocrylene 4.5%, Oxbenzone 6%

Purpose
Sunscreen

Uses • Helps prevent sunburn • If used as directed with other sun protection measures (see *Directions*), decreases the risk of skin cancer and early skin aging caused by sun damage

Warnings
For external use only • Do not use on damaged or broken skin • When using this product, keep out of eyes. Rinse with water to remove. • Stop use and ask a doctor if rash occurs • Keep out of reach of children. If swallowed, get medical help or contact a Poison Control Center right away.


Directions • Apply liberally 15 minutes before sun exposure • Reapply: after 80 minutes of swimming or sweating; immediately after towel drying; at least every 2 hours • **Sun Protection Measures:** Spending time in the sun increases your risk of skin cancer and early skin aging. To decrease the risk, regularly use a sunscreen with a Broad Spectrum SPF value of 15 or higher and other sun protection measures, including: limiting time in the sun, especially from 10 a.m.–2 p.m.; wearing long-sleeved shirts, pants, hats, and sunglasses • Children under 6 months: Ask a doctor

Other information • Protect this product from excessive heat and direct sun • Protect from freezing • May stain some fabrics

Inactive ingredients water, butylcyl, salicylate, silica, beeswax, styrene/acrylates copolymer, ethylhexylglycerin, glyceryl stearate, PEG-100 stearate, acrylates/C10-30 alkyl acrylate crosspolymer, triethanolamine, cyclopentasiloxane, acrylates/C12-22 alkyl methacrylate copolymer, acrylates/dimethicone copolymer, chlorphenesin, fragrance, diethylhexyl 2,6-naphthalate, dipotassium glycyrrhizate, disodium EDTA, BHT, methylisothiazolinone

Questions?
Visit www.hoolaban.com or call 800-299-4786

B Proposed



Hoolaban

Dry-Touch

SUNSCREEN

Broad Spectrum SPF 60+

60+

LIGHTWEIGHT
CLEAN FEEL

fast-absorbing
water resistant (40 minutes)

Active ingredients
Avobenzone 3%, Homosalate 15%, Octisalate 5%, Octocrylene 4.5%, Oxbenzone 6%

Purpose
Sunscreen

3.0 FL OZ (88mL)

Drug Facts

Active ingredients
Avobenzone 3%, Homosalate 15%, Octisalate 5%,
Octocrylene 4.5%, Oxbenzone 6%

Purpose
Sunscreen

Uses • Helps prevent sunburn • If used as directed with other sun protection measures (see *Directions*), decreases the risk of skin cancer and early skin aging caused by sun damage

Warnings
For external use only • Do not use on damaged or broken skin • When using this product, keep out of eyes. Rinse with water to remove. • Stop use and ask a doctor if rash occurs • Keep out of reach of children. If swallowed, get medical help or contact a Poison Control Center right away.

Directions • Apply generously and evenly 15 minutes before sun exposure • Reapply: after 40 minutes of swimming or sweating; immediately after towel drying; at least every 2 hours • **Sun Protection Measures:** Spending time in the sun increases your risk of skin cancer and early skin aging. To decrease the risk, regularly use a sunscreen with a Broad Spectrum SPF value of 15 or higher and other sun protection measures, including: limiting time in the sun, especially from 10 a.m.–2 p.m.; wearing long-sleeved shirts, pants, hats, and sunglasses • Children under 6 months: Ask a doctor

Other information • Protect this product from excessive heat and direct sun • Protect from freezing • May stain some fabrics

Ingredients water, butylcyl, salicylate, silica, beeswax, styrene/acrylates copolymer, ethylhexylglycerin, glyceryl stearate, PEG-100 stearate, acrylates/C10-30 alkyl acrylate crosspolymer, triethanolamine, cyclopentasiloxane, acrylates/C12-22 alkyl methacrylate copolymer, acrylates/dimethicone copolymer, chlorphenesin, fragrance, diethylhexyl 2,6-naphthalate, dipotassium glycyrrhizate, disodium EDTA, BHT, methylisothiazolinone

Questions?
Visit www.hoolaban.com or call 800-299-4786

What is Important to Consumers?

Key Points

Question What is the consumer's perceived importance and recall of the active ingredients in sunscreen when selecting a sunscreen product?

Findings In this qualitative study of 47 participants, active ingredients were not reported to be the primary factor influencing consumers' sunscreen selection. Consumers' recall of active ingredients was low, and few reported typically looking at the active ingredients; most consumers considered the sun protection factor rating to be the most important information for selecting a sunscreen.

Meaning Listing of active ingredients on the front label of sunscreen products may not be as useful to consumers for comparing and selecting sunscreens as previously thought.

Popular Sunscreens: Claims and Characteristics

ORIGINAL ARTICLE

Photodermatology, Photoimmunology & Photomedicine

WILEY

Online sunscreen purchases: Impact of product characteristics and marketing claims

Giselle Prado¹  | Ashley E. Ederle² | Shawhin R.K. Shahriari³ | Ryan M. Svoboda⁴ | Aaron S. Farberg⁵ | Darrell S. Rigel⁶

Popular Sunscreens: Claims and Characteristics

TABLE 2 Ordinal logistic regression analysis of sunscreen characteristic effect on best-seller position

	Odds ratio	95% Confidence interval	P-value
Price per ounce	1.002	0.990-1.014	0.700
Number of reviews	1.003	1.001-1.004	0.002*
Organic ingredients present			
No	Ref		
Yes	1.568	0.478-5.144	0.458
Inorganic ingredients present			
No	Ref		
Yes	0.775	0.265-2.264	0.641
Manufacturer in top 4 selling brands			
No	Ref		
Yes	2.159	0.864-5.395	0.100
SPF			
<30	Ref		
30-<50	1.476	0.270-8.055	0.653
≥50	1.902	0.329-10.997	0.473

TABLE 2 Ordinal logistic regression analysis of sunscreen characteristic effect on best-seller position

	Odds ratio	95% Confidence interval	P-value
Formulation			
Lotion	Ref		
Continuous Spray	2.623	0.812-8.469	0.107
Other	1.833	0.478-7.033	0.377
Water resistance			
No	Ref		
Yes	2.206	0.648-7.509	0.206
Total number of unregulated claims			
<6	Ref		
≥6	2.643	1.007-6.938	0.048*
Decreases the risk of skin cancer and early aging			
No	Ref		
Yes	0.160	0.050-0.511	0.002*

Popular Sunscreens: Claims and Characteristics

Unregulated marketing claims	Non-greasy	57.3%
	Fragrance-free	45.8%
	Paraben free	40.6%
	Dermatologist Recommended	39.6%
	Non-comedogenic	35.4%
	Weightless	33.3%
	Sensitive skin	31.3%
	Fast absorbing	31.3%
	Sport Active	27.1%
	PABA free	24.0%
	Hypoallergenic	24.0%
	Peds/Babies	21.9%

Dermatologists and Cosmetic Elegance

Factors that influence recommending sunscreen to patients

SPF of the sunscreen	155 (99.4)
Broad spectrum coverage provided by the sunscreen	150 (96.2)
Cosmetic elegance and feel and feel provided by the sunscreen	111 (71.2)
Photostability provided by sunscreen	66 (42.3)
Sunscreen contains oxybenzone	137 (87.8)
Sunscreen contains retinyl palmitate	122 (78.2)
Sunscreen contains zinc oxide or titanium dioxide	156 (100)
Sunscreen has an SPF ≥ 50	151 (96.8)
Spray formulation of sunscreen	114 (73.1)
Recommend vitamin D by oral supplement rather than sun exposure	125 (80.1)
Recommend sunscreen for $\geq 80\%$ of patients	123 (78.8)
Recommend sunscreen with SPF ≥ 30 to patients who are outdoors	156 (100)
Recommend sunscreen with SPF ≥ 50 to patients who are outdoors	55 (35.3)

71% of dermatologists considered cosmetic elegance in their recommendations for sunscreens in patients.

Conclusions

- Sunscreens are special
- Consumer reviews influence purchasing decisions
- Cosmetic elegance drives what is important to consumers
- Need to better regulate marketing vs product performance claims for sunscreens
- Improved public messaging needed from dermatologists, regulators, and scientific experts